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ABSTRACT

This paper describes the activities of Project Covert and Overt Responses to Education Simulation (CORES) designed to provide an identity for students and faculty desiring to engage in simulation-related research and development activities. Activities for investigating the use of simulation are in the directions of administrative decision making, problem solving and learning, supervision, and evaluation of education objectives; they focus on the development of research data, experience, and skills necessary to challenge four questions about the use of simulation. Evidence that may be used to shape simulation design includes the following: a) a simulated experience can be designed to significantly modify or change participant response behavior; b) the polygraph is an effective tool for measuring response behavior of participants; c) flexibility in designing simulated experiences can be achieved through the medium of slides or film; d) external criteria are not significantly related response behavior; e) level of dogmatism and decision-making style of participants may have some effect on response behavior; and f) feedback is a significant factor in shaping participant response behavior. The author concludes that there is an active interest in Project CORES and proposes the introduction of new and more sophisticated tools for measurement. (PD)

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AN OVERVIEW OF PROJECT COVERS

by Bill J. Reynolds

Project COVERS (Covert and Overt Responses to Educational Simulation) is a research and development activity concerned with the use of simulation in education. The major function of the project designation is to provide an identity for those students and faculty desiring to engage in simulation related research and development activities. The project office will provide coordination for research activities when requested. It has become a depository for data, materials, information, software, and equipment that can be helpful in developing new research thrusts or applications of existing simulation packages for instruction. The project activities are centered at Bowling Green State University.

The project began approximately three years ago through the efforts of four doctoral students (Coulter, Dyrenfurth, Poor, and Ryckmann) and their major professor (Reynolds). It was visualized as a broad research thrust to investigate participant response behavior to realistically simulated experiences in education. The project initially envisioned four major activity directions for investigating the use of simulation. The first direction was termed administrative decision-making; the second was problem solving and learning; the third was supervision; and the fourth was evaluation of educational objectives. Each of these

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directions would require major research effort to develop a body of knowledge and techniques necessary for the effective and purposeful application of simulation.

The focus of the project was to develop research data, experience, and skills necessary to challenge the following questions:

1. Can simulation be used to effectively train decision-makers in an educational setting?

2. Can simulation be used to effectively train teachers in the classroom? Additionally, can simulation be used to effectively train counselors and special teachers to function in one to one contacts with students?

3. Can simulation be used to effectively train supervisors to function in the roles of counselor, advisor, and change agent?

4. Can simulation be used to assess achievement of behavioral or competency based objectives in an educational setting?

Underlying the concern for answering the above questions was the assumption that this project could develop reality oriented curricular experiences in the classroom through the use of simulation. The simulated experiences could be designed to provide an assessment of future student behavior and further, this assessment or index could serve as the basis for counseling and programming remedial requirements. The rationale above did not intend to suggest that simulation would be used to supplant the field experience. It did intend to suggest that research on response behavior in simulations could be used as the basis for providing structure and direction to student field experiences. Further, it did intend to suggest that simulation could be used to enhance the depth and variety of training experiences of students in

a potentially controlled and evaluative environment.

The research assumptions developed for carrying out the investigative efforts planned for Project COMES were not unusual with two possible exceptions. The first possible exception was the assumption that there is a high potential for paradox between expressed and manifest response behavior of participants in simulation. It was postulated that overt or expressed participant responses in simulation are not in themselves adequate indices of manifest or operational behavior of participants. Therefore it was desirable to introduce a new measurement tool (polygraph) that may be more effective in assessing potential operational or manifest behavior and its relationship to overt or expressed behavior.

The second exception was the assumption that laboratory controls were essential to effectively monitor response behavior of participants. Thus, simulated experiences were developed for participants in an isolation type laboratory setting with the potential for creating an overall environment that was reality oriented. The dynamic educational simulator (DES) was the product of the foregoing assumptions.

Phase one of Project COMES was launched within the framework of this somewhat limited rationale. The focus of phase one was administrative decision-making. Research efforts were designed to provide data and skills to challenge the following question: Can simulation be used to effectively train decision-makers in an educational setting? It was determined that the administrative role to be used in developing initial simulation experiences (software) would be the principalship. The first three research efforts conceived in Project COMES, phase one, were those reported by Coulter,[1] Dyrenfurth,[2] and Poor.[3]

Phase one of Project COMES has continued with four additional investigations completed or underway. Jordan and Varis have each completed a study based on a new software simulation package focusing on decision-making in the elementary principalship. They used galvanic skin response (GSR) and heart rate (HR) to measure levels of psycho-physiological activity of participants. The same general configuration of the dynamic educational simulator (DES) was employed as in earlier studies.

The Jordan study was designed to investigate the relationship between performance on the Rokeach Dogmatism Scale[4] and psycho-physiological activity of participants during a simulation. In addition, this study employed an experimental group and a control group of participants to study the effects of negative feedback on the psycho-physiological activity of participants. The findings reported by Jordan suggest that measured levels of dogmatism of participants and psycho-physiological response behavior of participants in simulation are not significantly related at the .05 level. Negative feedback controlled and administered during simulation significantly increased the levels of psycho-physiological activity (especially GSR) of both high and low dogmatics at the .05 level. In summary, Jordan's research suggests that negative feedback (a red light indicating disagreement with the participant's decision) was effective in changing participant response behavior in simulation for the population (30) that he studied. In more general terms, his research provides an important clue, namely feedback, for designing simulations with increased levels of participant involvement.[5]

The Varis study attempted to classify overt response behavior of

participants within the framework of the Getzels, Guba leadership-followership styles.[6] A validation of the overt response choices developed for the simulation was conducted. From the validation study, four response choices were selected for each of the six decision situations in the simulation. Two of the response choices were rated personal and the remaining two were rated normative. The simulation was organized to provide each participant an opportunity to rate his or her decision-making style as personal, normative, or transactional near the end of the simulation experience. An index of congruency was derived for each participant based on decision choices and self-rating of decision-making styles.

The research conducted by Varis was designed to investigate the relationship between an index of participant congruency of choice in simulation and measured levels of participant dogmatism. In addition, this study investigated the relationship between participant congruency of choice in simulation and levels of psycho-physiological activity. The population (60) studied in this investigation was divided into a control and an experimental group. The experimental group was administered controlled negative feedback.

Varis reported that he found no significant relationship between congruency of choice, dogmatism, or level of psycho-physiological activity of participants in his control group at the .05 level. Congruency of choice was significantly related to dogmatism, but not significantly related to level of psycho-physiological activity of participants in the experimental group (received negative feedback) at the .05 level. He did find that the mean difference between congruency of choice in the control and experimental group was significant at the

.01 level. He concluded from his study that negative feedback interferred with congruency of choice in the experimental group. High dogmatics especially displayed incongruency under negative feedback conditions. He further observed that negative feedback seemed to induce a "search pattern" in participant decision-making behavior and may be an important consideration in simulation design.[7]

The two studies currently underway are being conducted by Littrell and Uncapher. The Littrell study has been designed to further investigate the relationships between external participant characteristics (primarily demographic), expressed overt responses, and psycho-physiological participant response behavior in simulation. The Uncapher study has been designed to compare participant response behavior in two different modes of simulation. In addition, an external measure of control ideology[8] of participants will be compared with expressed response behavior in simulation. It is anticipated that this study will provide significant data for analyzing the effects of feedback, both positive and negative, on participants in simulation. The results or findings of the Uncapher study will be available by Fall 1974 and the Littrell study by early 1975.

Two studies are in the early stages of proposal and development. It is anticipated that both studies will use the polygraph in a "lie detector" mode with an attempt to eliminate or reduce the effects of motion artifact on psycho-physiological measures. The first study will focus on differences between expressed and manifest response behavior. The second study will attempt to evaluate the simulation experience in terms of attitude change and other external characteristics of the participant.

Like most endeavors of this nature, Project COMES has not reached its full potential because of insufficient resources. Personnel, equipment, and money are required to broaden the scope of the research activities and in turn create opportunities for optimal kinds of studies in the project. To date, the activities of the project have been subsidized by Bowling Green State University through research grants to students and the project director totalling approximately $2,500. Additional sums, equipment, and materials have been contributed by those associated with the project. Needed equipment, space, materials, and professional consultation have been begged, borrowed, and "scrounged" from other departments in the university and nearby private business firms.

Project COMES has achieved several of its original objectives in a limited fashion. The research activities of the project have provided important evidence that may be used to shape simulation design. A biased view of the project suggests that this evidence even though not conclusive may be described as follows:

1. A simulated experience can be designed to significantly modify or change participant response behavior.

2. The polygraph is an effective tool for measuring response behavior of participants in simulation.

3. Flexibility in designing simulated experiences can be achieved through the medium of slides or film.

4. External criteria such as demographic factors are not significantly related to response behavior in simulation.

5. Level of dogmatism and decision-making style of participants may have some effect on response behavior in simulation.

6. Feedback is a significant factor in shaping participant

response behavior in simulation.

Students and professors who continue to relate to the project are encouraged by the research and development activities that have emerged. It has been proposed that it would be desirable to introduce an array of new measurement tools. Sophisticated telemetry units developed in the space program, polygraphic type voice recorders, and brain wave sensors are frequently identified as promising applications. There is interest in evaluating new audio-visual developments that can be utilized for producing simulation experiences with a higher degree of fidelity. One process frequently identified in this regard is the holographic type images produced by laser beams.

In conclusion, there is an active interest in project COMES and the research and development activities that may be launched in the project. New proposals ranging from longitudinal studies on the effects of simulation to investigations attempting to correlate response behavior in reality with response behavior in simulation are being weighed. The whole area of relating participant response behavior in simulation to indices of achievement or readiness continues to challenge investigators. Perhaps, equally important as the new evidence produced is the process available in the project to involve people in a meaningful way in the quest for new knowledge.

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9. Karen Uncapher and Lee W. Littrell are doctoral students at Bowling Green State University in the Department of Educational Administration and Supervision.